

REMARKS

In the parent application Ser. No. 09/820,079 filed March 28, 2001, a Final Office Action dated February 13, 2004, objected to claims 1-14 and 16-20 for being unpatentable over Chen, Wang, Wolf, Fink and Bains. The present continuation application has been filed to further prosecute claims 1, 3-10, and 12-20. Thus, the instant Preliminary Amendment will address the rejections from the parent application's Final Office Action.

Claim 1, 3-10, and 12-20 remain in the application. Claims 1, 9, and 16 have been amended to include the limitation of the etch stop being less than about 600 angstroms thick. Support for these amendments is found in the Detailed Description section of the current application, page 11, line 23. No new matter has been added with this amendment.

B. 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Chen in view of Fink - Claims 1, 5-8

Claims 1 and 5-8 stand rejected under 35 U.S.C. § 103(b) as being unpatentable over the U.S. Patent No. 6,211,061 B1 issued April 3, 2001 to Chen et al. (hereinafter "the Chen patent") (Final Office Action, page 2) in view of Fink et al. (Standard Handbook for Electrical Engr,

McGraw-Hill, NY 1968) (hereinafter the “Fink reference”). For at least the reasons set forth below, Applicants submit that the claims 1 and 5-8 are not rendered obvious by the Chen patent in view of the Fink reference.

As previously stated, claim 1 of the present invention has been amended to include the limitation that the etch stop layer has a thickness below about 600 angstroms. With regard to claim 1, the Office relies on the Chen patent (col. 5, line 65 through col. 6, line 22) for a teaching of a “diffusion barrier layer 24 with a thickness of 300-500 angstroms that has an etch stop layer (30) above and on the diffusion barrier layer, the etch stop layer having a thickness in the range of 1,600 to 7,000 angstroms.” (Final Office Action, page 2).

“To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” In *re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The Chen patent does not disclose or suggest a thickness for the etch stop layer below about 600 angstroms, as described in the amended claim 1 of the present invention. Therefore, claim 1 is not rendered obvious by the Wang patent.

In addition, the Chen patent teaches away from using an etch stop layer of 600 angstroms or less, because the “etch stop” layer 30 disclosed in Chen is used to etch a trench 35 which is preferably between 4,000 and 8,000 angstroms (col. 6, line 18-19), so that the thickness of the “etch stop” layer 30 of Chen is made thicker (1,600-7,000 angstroms) to allow for the trench depth.

Furthermore, even though it might be true that the effective dielectric constant of the structure relied upon in the Chen patent may be less than three (upon which the Applicants do not concede) as calculated by the Fink reference, the Fink reference as well does not disclose an etch

stop layer that is less than about 600 angstroms that is above and on a diffusion barrier layer that is less than about 1,000 angstroms.

Regarding claims 5 and 6, the Office relies on the Chen patent for a teaching of the barrier layer being inorganic and the etch stop layer being organic. However, as described above, neither the Chen patent nor the Fink reference teach or suggest an etch stop layer that is less than about 600 angstroms in thickness.

Regarding claim 7, the Office relies on the Chen patent for a teaching of an electrically conductive trace in the substrate. However, neither the Chen patent nor the Fink reference teach or suggest an etch stop layer that is less than about 600 angstroms.

Regarding claim 8, the Office contends that although the Chen patent does not disclose a dual damascene structure, it would have been obvious to alter the shape of the single damascene to produce a dual damascene. However, neither the Chen patent nor the Fink reference teach or suggest an etch stop layer that is less than about 600 angstroms.

Chen in view of Fink and further in view of Wang, Wolf and Gabriel - Claims 3-4

Claims 3 and 4 stand rejected under 35 U.S.C. § 103(b) as being unpatentable over the Chen patent in view of the Fink reference and further in view of the U.S. Patent No. 6,291,887 B1 issued September 18, 2001 to Wang et al. (hereinafter “the Wang patent”) and Wolf (Silicon Processing for the VLSI era, Lattice Press)(hereinafter “the Wolf reference”) and in view of the U.S. Patent No. 6,448,654 B1 issued September 10, 2002 to Gabriel et al. (hereinafter “the Gabriel patent”). For at least the reasons set forth below, Applicants submit that claims 3 and 4 are not rendered obvious by the Chen patent in view of the Fink reference and further in view of the Wang patent, the Wolf reference and the Gabriel patent.

Regarding claims 3 and 4, the Office contends that while the Chen patent does not disclose an organic barrier layer and an inorganic etch stop layer, the Wang patent discloses such a structure, and that the etch stop layer of the Wang patent is between 4,000 and 8,000 angstroms. However, neither the Chen nor the Fink nor the Wang disclose or suggest using an etch stop layer that is less than about 600 angstroms. In fact, the Wang patent teaches away from using an etch stop that is less than about 600 angstroms.

Even though the Office relies on the Gabriel patent and the Wolf reference to show a dielectric constant of less than three for the relied upon structure, neither the Chen patent nor the Fink reference nor the Wang patent nor the Wolf reference nor the Gabriel patent teach or suggest an etch stop layer that is less than about 600 angstroms that is disposed on a barrier layer that is about 1,000 angstroms or less in thickness. Therefore claims 3-4 are not rendered obvious by the Chen patent in view of the Fink reference and further in view of the Wang patent, the Wolf reference and the Gabriel patent.

C. 35 U.S.C. § 102(e)

Chen - Claims 9, 10, 16-18

Claims 9, 10, 16-18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by the Chen patent (Final Office Action, page 5).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Regarding claims 9 and 10, independent claim 9 includes the limitations of an etch stop layer that is about 600 angstroms or less. As described previously herein, the Chen patent does not disclose an etch stop layer that is less than about 600 angstroms, and therefore claims 9 and 10 which depends from 9, are not anticipated by the Chen patent.

Regarding claims 16-18, independent claim 16 has been amended to include the limitation of an etch stop layer less than about 600 angstroms. Therefore, since the Chen patent does not disclose each and every element of claim 16, from which claims 17-18 depend, claims 16-18 are not anticipated by the Chen patent.

D. 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Chen in view of Fink and further in view of Wolf– Claims 12-14

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Chen patent in view of Fink and further in view of Wolf. The Office contends that although the Chen patent does not disclose the effective dielectric constant for the relied upon structure, the Fink reference provides a readily obtainable effective dielectric constant by calculation. However, as described above, neither the Chen patent nor the Fink reference nor the Wolf reference teach or

suggest an etch stop layer that is less than about 600 angstroms, that is disposed on a barrier layer that is less than about 1,000 angstroms, as disclosed in claim 9 of the present invention from which claims 12-14 depend. Therefore claims 12-14 are not rendered obvious by the Chen patent in view of the Fink reference and further in view of the Wolf reference.

Chen in view of Wolf– Claims 19

Claims 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Chen patent in view of the Wolf reference. The Office contends that although the Chen patent does not disclose the dielectric constant for the second dielectric layer, the Wolf reference discloses the dielectric constant of the second dielectric layer. However, amended claim 16 includes the limitation of an etch stop layer that is less than about 600 angstroms, and since neither the Chen patent nor the Wolf reference disclose or suggest all of the limitations of claim 16, from which claim 19 depends, claim 19 is not rendered obvious by the Chen patent in view of the Wolf reference.

Chen in view of Bains– Claim 20

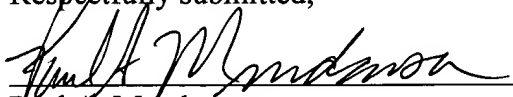
Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Chen patent in view of the Bains (Nanostructured Dielectrics Good Candidates for Next Generation Computer Chips, OE Reports, No. 194) (hereinafter “the Bains reference”). The Office contends that although the Chen patent does not disclose that the dielectric constant for the second dielectric layer is about 2, the Bains reference discloses a dielectric material with a dielectric constant of about 2.2 that would be obvious for use in forming the second dielectric layer. However, amended claim 16, from which claim 20 depends, includes the limitation of an etch stop layer less than about 600 angstroms, and since neither the Chen patent nor the Bain

reference disclose all of the limitations of claim 16, from which claim 20 depends, claim 20 is not rendered obvious by the Chen patent in view of the Wolf reference.

In view of the foregoing remarks, the Applicants request allowance of the application. Please forward further communications to the address of record. If the Examiner needs to contact the agent, Kathy J. Ortiz, to further the prosecution of the application, the contact number is (503) 264-0944.

Dated: May 12, 2004

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Paul A. Mendonsa", written over a horizontal line.

Paul A. Mendonsa

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